LAWRENCE LIVERMORE
REPORT

A weekly collection of scientific and technological achievements from Lawrence Livermore National Laboratory, July 12-16, 2010

Keeping an eye on lasers

A laser that helps astronomers examine new planets has been adapted to help doctors examine cells in the eye. The breakthrough is enabled by new miniature mirrors at Lawrence Livermore.

Lasers have been used for surgery and 2D imaging for years, but a new animation provides first 3D view inside a living eye clear enough to see individual cells.

During an eye exam, your doctor flips a series of lenses between you and the wall chart. A device called a MEMS does the same thing for the largest telescopes in the world.

In a 1992 experiment, Lawrence Livermore Lab shot into space a laser beam visible for miles. As the beam bounced off a layer in the atmosphere, its reflection was distorted. That distortion was corrected by a special mirror that mimics the corrective lenses your optometrist uses, reshaping itself a thousand times a second.

To see a video, go to
http://abclocal.go.com/kgo/story?section=news/drive_to_discover&id=7549309

Fusion turns on Moses

Ed Moses in NIF.

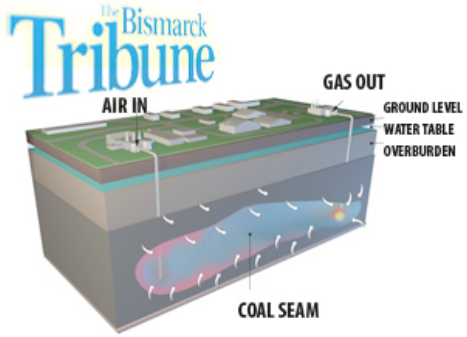
When Ed Moses, director of LLNL's National Ignition Facility, was a freshman in college, he saw one of the first lasers, and said while it looked cool "It just turned me on."

From then on, Moses has dedicated his life to lasers and most recently to achieving fusion (creating the power of the sun in the Laboratory). And NIF just might be his ticket.

Not only is he working with the most powerful laser in the world, but when he's not at work, he volunteers his time to inspire the next generation of inventors. His volunteer work has earned him the Jefferson Award for Public Service.

To read more about Moses, go to
http://cbs5.com/jeffersonawards/jefferson.awards.moses.2.1804518.html

Turning lead into gold



Underground coal gasification

Accessing billions of tons of coal buried deep underground may be a challenge to some, but to researchers at Lawrence Livermore, that coal can be converted to low-cost, clean fuels with a process gaining traction around the world.

The technique, underground coal gasification, "turns lead into gold," according to Julio Friedmann, an expert on the process, also known as UCG.

"It could be the bridge to a low-carbon, energy-rich future," said Friedmann, an LLNL researcher in carbon management. "I consider this to be the cleanest coal."

To read more, go to http://www.bismarcktribune.com/business/local/article_8d813728-8acb-11df-a4a4-001cc4c002e0.html?mode=story

Eye spy an artificial retina

Artificial retina team member Terri Delima holds a thin-film artificial retina array.

There is new hope for millions of people suffering from eye disease. Many are going blind because of age-related macular degeneration and other conditions. But a new device called an artificial retina has already restored partial sight to several patients.

Satinderpall Pannu heads the artificial retina project at Lawrence Livermore. Starting with a silicon wafer and a thin coating of polymer, the disk is processed, electrodes are added and the implant is encased in titanium and gold. "It's amazing to me that technology that we've developed here at the lab can actually restore someone's sight," Pannu said.

To read more, go to http://www.kvoa.com/news/artificial-retina-offers-new-hope/

Seeing what's fueling stars

Inside the NIF target chamber.

Contra Costa Times columnist Tom Barnidge recently visited LLNL and was awed by the National Ignition Facility.

He says NIF is the most intriguing operation because it not only conducts experiments to ensure the reliability of America's nuclear stockpile, but also hopes to solve the nation's energy problems.

The goal is to focus 192 powerful laser beams to fuse the nuclei of tritium and deuterium, which produces a helium nucleus that has a slightly smaller mass, leaving the difference to be released in kinetic energy.

Fusion is the same energy that fuels the sun and the stars. NIF is a proof of concept that fusion can be created in a laboratory on earth and help solve the world's energy problems.

To read more, go to http://www.contracostatimes.com/columns/ci_15480457?source=email

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institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

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